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PCT/FR95/01233 New claims after preliminary international examination. Translation of french text (TE970319). (TE970422)

## IMPROVED TELESCOPE

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### NEW CLAIMS

1- Optical device comprising a membranous mirror and a mean actuating the shape of said mirror,

characterised in that :

10 a) the mirror (45) and its actuating mean (46) are concentric membranes, free at their peripheries and tied together at their central regions,

15 b) the membranes, or only the actuating membrane have surface devices, conductors, insulators and semi-conductors, separated, contiguous or stacked, constituting integrated circuits and electrodes.

2- Optical device according to claim 1 characterised in that the mirror (45) and its actuating membrane (46) are made totally or partially of a material having shape memory.

3- Optical device according to claim 1 characterised in that, for 20 their folding, the mirror (45) and the actuating membrane (46) are made quasi flat by a succession of centred distorsions, alternately concave and convex.

25 4- Optical device according to claim 1 characterised in that the membranes constituting the mirror (45) and the actuating membrane (46) are obtained by depositing a substance on a liquid contained in a vertical container rotating around its vertical axis.

5- Optical device according to claim 4 characterised in that the membranes have peripheral and/or central flanges shaped on the walls of the container.

30 6- Optical device according to claim 4 characterised in that electrodes create an electric field distorting the shape of the surface of the rotating liquid.

7- Telescope comprising :

35 a) a first storey containing a membranous mirror and a actuating mirror device,

08/809620

2/6

US/08/809620 (TE970422)

b) a second storey situated at the mirror focus and comprising the means for observing image.

c) a third storey situated at level of mirror curvature centers, and comprising a mean of recognising the shape of the mirror,

5 d) a mean of tying together the three storeys,

characterised in that the mean of recognising the shape of the mirror is constituted by :

10 e) a photo-electric matrix (128), preferably a portion of a concave sphere, placed slightly beyond the theoretical sagittal segment (119) of the main mirror (45), centred on the theoretical optical axis (39) of the telescope, its concave side turned towards the sagittal segment, and its centre of curvature being preferably at the middle of the sagittal segment.

15 f) a movable opaque screen (129) perpendicular to the optical axis (39) of the telescope, having in its central portion a hole (131) situated on this optical axis, and moving in parallel with said optical axis in such a way that the central hole scans the sagittal segment.

20 8- Telescope according to claim 7 characterised in that the movable screen (129) is replaced by several stacked polarised cells (129.1), all of them having at their centre an inactive zone (131.1), these cells being successively activated in such a way as to simulate the displacement of the screen (129).

25 9- Telescope according to claim 7 characterised in that the spherical matrix (128) has a central hole in which is placed a cylinder (132) the axis of which is the same as the optical axis, and which is mobile along this axis, and having at the end which is turned towards the sagittal segment, a photo-electric matrix (133).

30 10- Telescope according to claim 7 characterised in that the face of the screen (129) turned towards the main mirror (45) is covered with a photo-electric matrix.

35 11- Telescope according to claim 7 characterised in that the mean recognising the shape of the mirror, situated at the control stage and defining the optical axis of the mirror, moves inside a circle centred on the optical axis of the telescope, and perpendicularly

08/809 620

3/6

US/08/809620 (TE970422)

to this axis.

12- Telescope according to claim 7 characterised in that a large size circular screen (127), perpendicular to the optical axis of the telescope, and centred on this axis, is located beyond or on the side of the sagittal analyser, and in the later case has in its centre an annular hole of the same size as the said sagittal analyser.

13- Telescope according to claim 7 characterised in that the means controlling the mirror modify continuously the generating line of the mirror, while maintaining the shape of revolution of the mirror, in such a manner that at each instant exists a circle of minimum aberration (88) centred on the optical axis (39) and moving from the optical axis towards the outside or vice versa.

14- Telescope according to claim 7 characterised in that one or several photo-electric matrices (89) scan the circle of minimum aberration (88).

15- Telescope comprising several tied storeys, characterised in that the means tying the storeys is a cylinder (2) closed at one end and rigidified by tubes under pressure and by polymerization of a resin impregnating the said cylinder and tubes.

16- Telescope according to claim 15 characterised in that the cylinder (2) closed at one end tying the three telescope storeys together is placed into a protecting jacket (3).

17- Telescope according to claim 15 characterised in that the closed at one end cylinder (2) and the protecting jacket (3) are first folded by telescopic invagination then by folding spokes wise and scrolled along radiuses.

18- Telescope according to claim 15 characterised in that closed tubes associated by links to jacket (3) or to closed at one end cylinder (2) of the telescope are folded by telescopic invagination at the same time as cylinder (2) or jacket (3), and have apertures through which a pressurised gas can be introduced to provoke their extension.

19- Telescope according to claim 15 characterised in that the means of folding are made of linear vertical elements associated

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by pairs, vertically mobile from an upper position to a low position, and integral of radial displacement means, moving continuously from a position far from the centre to a position closed to the centre.

5 20- Telescope according to claim 15 characterised in that the envelope (2) and the jacket (3) are made of two separated elements, the upper cylindrical element, open and comprising the focal storey and the centre of curvature storey, and the lower cylindrical element, closed at one end and comprising the mirror storey.

10 21- Telescope according to the claim 15 characterised in that a winding centred on the optical axis of the telescope surrounds the means of uniting the three storeys at the level of the mirror storey, and/or where a wiring or a magnet (142) with axis on same optical axis are tied to the mirror storey of said telescope.

15 22- Telescope according to claim 15 characterised in that windings laid out symmetrically around the axis of the telescope (1) and are tied onto the closed at one end cylinder (2) at the level of the mirror storey.

20 23- Telescope comprising several tied storeys, characterised in that the means which unite the several storeys is a tripode pyramidal frame the triangular base of which is contained within a circle distinctly smaller than the mirror.

25 24- Telescope according to claim 23 characterised in that the frame is made from flexible tubes having a complex annular structure comprising, going from the outside to the inside :  
a) a textile layer for absorbing the solar radiation,  
b) an insulating layer,  
c) a textile layer impregnated with a resin curing under temperature or under the effect of a gas,  
30 d) an exothermic coating reacting under the effect of a gas.

25- Telescope comprising :  
a) a first storey comprising a membranous mirror and device actuating this mirror,  
35 b) a second storey situated at the mirror focus and comprising means for observing image.

c) a third storey situated at level of mirror curvature centers, and comprising a mean of recognising the shape of the mirror,

d) a mean of tying together the three storeys,

e) a lighting device to light an object under scrutiny by the telescope,

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characterised in that the lighting device comprises :

f) a laser (102) situated on the optical axis (39) of the main mirror (45), at the level of the mirror storey and emitting beam parallel to said optical axis.

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g) a second convex semi transparent parabolic mirror (101) the axis of which is the same as the axis (39) of main mirror (45), the convex part of which is oriented towards the main mirror, and its virtual focus confounded with the real focus of the main mirror.

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h) a third parabolic mirror (106), the axis of which is the same as the optical axis of main mirror, the convex part of which is oriented towards this main mirror, and giving a punctual image of the laser beam.

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26- Telescope according to claim 25 characterised in that the centre of the secondary mirror is totally reflecting onto a surface which is the projection of the surface of the photo electric image-recieving matrix on the surface of the mirror.

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27- Telescope according to claim 25 characterised in that the secondary mirror (101) is made from a parallel faces parabolic diopter the convex face of which is a semi-reflecting coating.

28- Telescope according to claim 25 characterised in that a second photo electric matrix is placed back to back with the preceding matrix.

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29- Telescope according to claim 26 characterised in that a cut band filter protects the image-receiving photo-electric matrix from the laser beam having crossed the secondary semi-transparent mirror (101).

30- Telescope comprising several storeys,

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characterised in that one or several spherical concave mirrors (112) are tied to one of the storeys, and in that the curvature centers of this or these mirrors are located in another storey.

- 31- Optical device according to claim 1, characterised in that the actuating membrane is tied at its periphery at a rigid support (138), or is applied onto the surface of this rigid support (138), or constitute the superficial layer of this rigid support (138).
- 5       32- Optical device according to claim 31 characterised in that annular covers (140) and (141) fitted with inside surface devices electrically linked with the rigid support (138), are laid onto the centre and periphery of said rigid support, said covers covering the periphery and the centre of the mirror (45).
- 10      33- Optical device according to claim 31 characterised in that a cylindrical jacket (134), made of soundproofing materials, closed at its upper end by an optical membrane (135), is put under pressure in such a way as to stretch the optical membrane (135) that closes it.